Chapter 2

INSTRUCTIONAL SYSTEMS DEVELOPMENT AND PROJECT MANAGEMENT

Overview

Introduction

This chapter provides an overview of the Instructional Systems Development (ISD) process, an overview of the major processes and principles associated with managing an instructional systems development project, and the special considerations associated with managing an instructional technology and/or DL development project.

Where to Read About It

This chapter contains four sections:

References

The material in this chapter is based on the following references:

- MIL-PRF-29612, *Training Data Products*
- MIL-HDBK-29612-1, *Department of Defense Handbook, Guide for Acquisition of Training Data Products and Services*
- MIL-HDBK-29612-2, *Department of Defense Handbook, Instructional Systems Development/Systems Approach to Training and Education*
- MIL-HDBK-29612-3, *Department of Defense Handbook, Development of Interactive Multimedia Instruction (IMI)*
- MIL-HDBK-29612-4, *Department of Defense Handbook, Glossary of Training Terms*
- *Distance Learning Curriculum Analysis and Media Selection,* Air University, Maxwell AFB, AL, 4 Feb 1994
- AF Handbook 36-2235, *Information for Designers of Instructional Systems, Volume 4*
- AF Manual 36-2234, *Instructional Systems Development*
- AFDLO Home Page web site: *http://www.au.af.mil/afdlo*

Section A

OVERVIEW OF THE ISD PROCESS

Overview of Instructional Systems Development

Introduction

This section provides an overview of the ISD process and addresses the use of ISD for IT projects. Detailed information on the ISD process may be found in MIL-PRF-29612, *Training Data Products*, and its supporting handbooks.

Analysis Phase

The Analysis Phase is the process used to identify the critical tasks that are required for job performance. It identifies and defines those tasks for which education or training must be accomplished.

- Course entry requirements are defined (prior education, training, and/or experience).
- The target population and training environment are defined.
- Mission/job performance requirements are identified to develop a task list.
- Critical tasks are identified; education and/or training must be accomplished for each critical task.
- The performance standards, performance behavior, conditions of behavior and performance measurement standards are determined for each critical task.
- The knowledge, skills, and attitudes (including judgment and decision-making knowledge and skills) required to perform each job task are identified.

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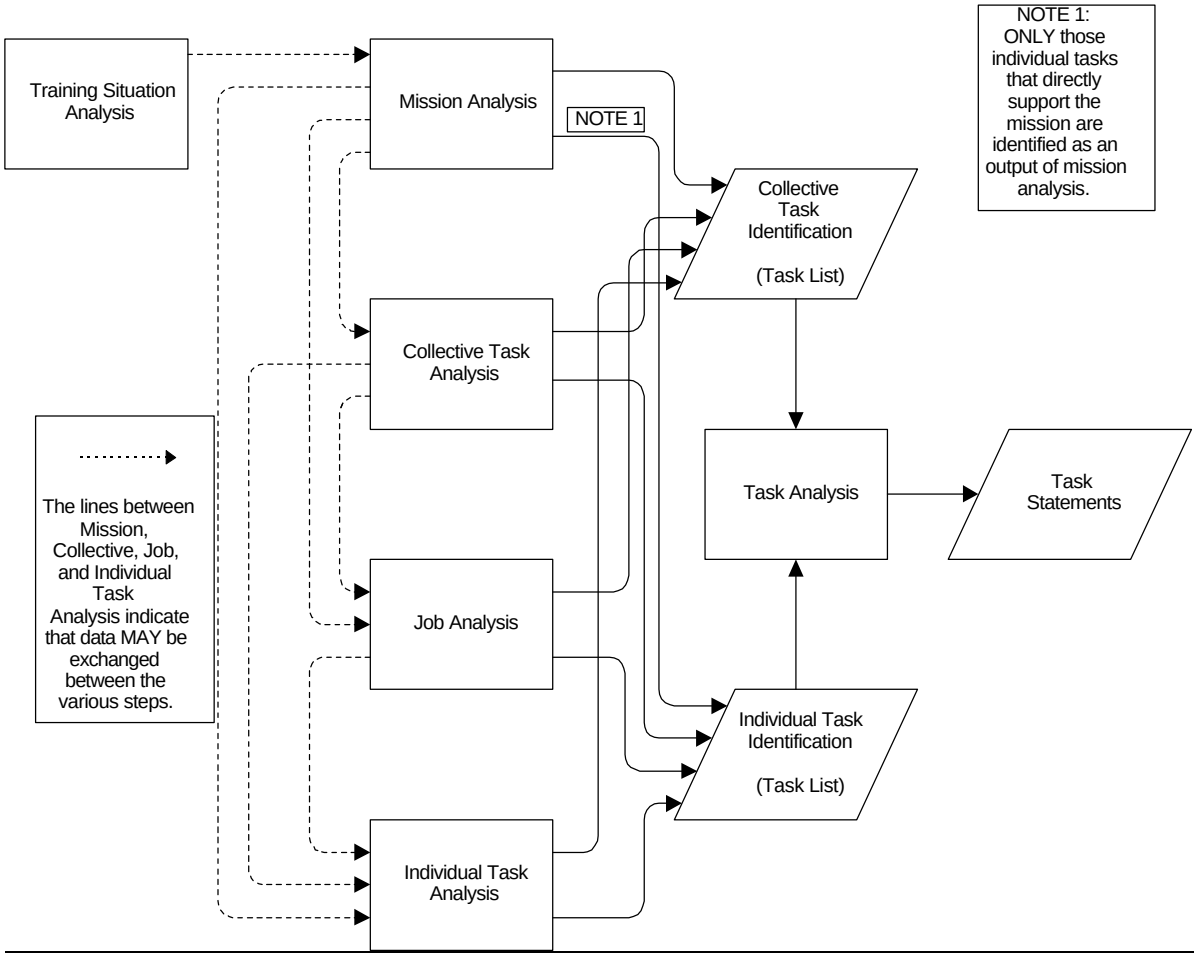
Overview of Instructional Systems Development (continued)

Analysis Phase (continued)

The following flowchart describes the ISD Analysis Phase.



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Overview of Instructional Systems Development (continued)

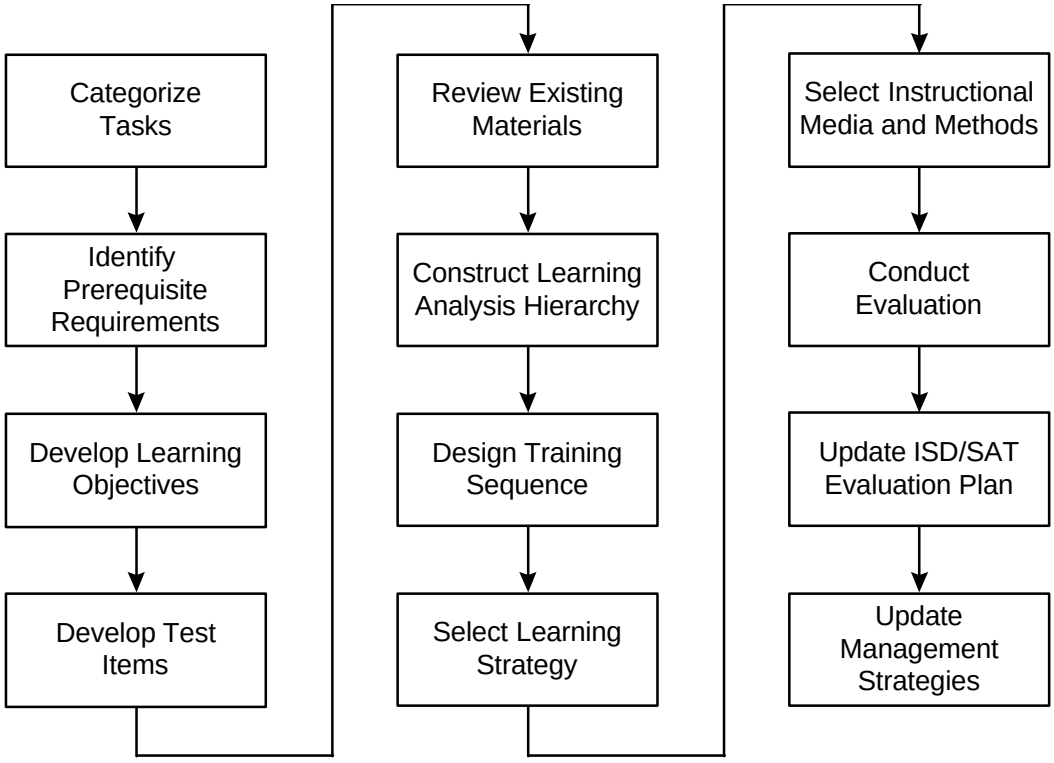
Design Phase

The Design Phase is based on the results of the Analysis Phase.

- Knowledge, skill, and attitude learning objectives are developed.
- Performance test items are developed.
- Existing instructional materials are reviewed for applicability.
- The instructional methods and media are selected.
- The Course of Instruction (phases, units, modules, and lessons) is designed.
- The Implementation Plan for the Course of Instruction is designed.
- A Training Information Management System for the Course of Instruction is designed.

Design Process Flowchart

The following flowchart depicts the ISD Design Phase.



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Overview of Instructional Systems Development (continued)

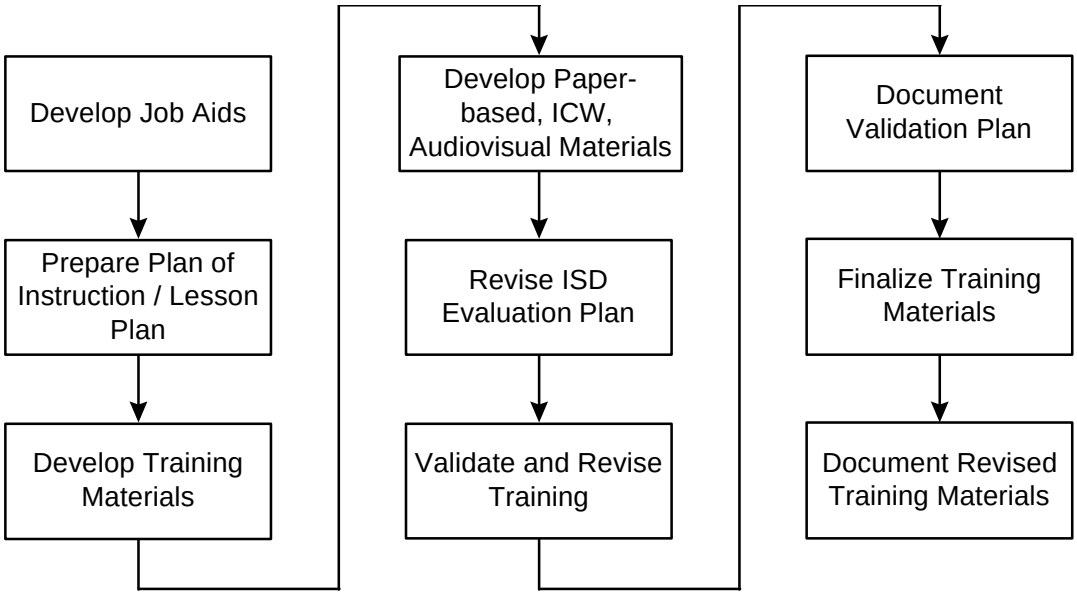
Development Phase

The Development Phase is based on the results of the Design Phase.

- The student and instructor lesson materials (instructor guides, student guides, lesson plans and scripts, etc.) are developed.
- Instructional media are developed.
- The implementation plan is updated.
- Formative evaluation of instructional materials and the Course of Instruction are accomplished.
- Summative evaluation of the instructional materials and the Course of Instruction are completed.

Development Process Flowchart

The following flowchart depicts the ISD Development Phase.



Implementation Phase

The Implementation Phase is completed after the Design and Development Phases are completed.

- The instructional system is fielded.
- Operational evaluation (field evaluation) of the instructional system is accomplished.

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Overview of Instructional Systems Development (continued)

Evaluation Phase

Evaluation is a continuous process that is integrated into each phase of the ISD process. It starts in the analysis phase with the formative evaluation of the development process and products and continues for the life cycle of the instructional system.

- It provides feedback used to modify the education or training program as necessary.
- It identifies both intended and unintended outcomes so that decision-makers can make necessary adjustments in the instructional program.
- It usually involves formal and informal processes that measure the effectiveness of instruction, delivery systems, and support functions.

There are three types of evaluation:

- *Formative Evaluation:* Provides information about the effectiveness of products and processes as they are being developed. Performed periodically from initial ISD planning throughout the development phase; can include small-group tryouts of instructional components; used to validate design of individual components of the instructional system for integration. Objective is to identify deficiencies early, when revision is least expensive.
- *Summative Evaluation:* Provides information to determine the "summed effect" of instruction under operational conditions. Used to assess full system integration and effectiveness of the individual components; based on an operational tryout of the program (normally 2 or 3 classes) using real student throughput and full instructional system operation. Objective is to ensure that the instructional system is fully integrated and achieves desired outcomes.
- *Operational Evaluation:* includes periodic internal and external evaluation of the instructional program to ensure graduates meet established education and training requirements. Performed periodically from completion of the operational tryout throughout the life of the instructional system. Objective is continuous improvement and maintenance of instructional effectiveness.

Formative evaluation occurs at each phase of the project and usually involves both an internal review by the team as well as a review and approval by the customer. Formative and summative (try-out) evaluation processes can involve validation of the instruction (conducting a beta test of the instruction) with sample student groups as appropriate. The objective is to identify and address problems before the training program is fully deployed. This can involve the redesign of faulty lessons, resolution of technical problems, and the refinement of support documentation.

The course owner usually conducts the operational evaluation of instructional effectiveness to determine whether the instruction accomplished its intended purpose.

The ISD Process and Instructional Technology (IT)

Introduction

With the increasing use of advanced technologies over the past 15 years, emphasis has been placed on defining the costs and benefits of technology options earlier in the ISD process. Instead of waiting until the design phase to identify the optimum mix of media for a given instructional program, the IT development team will begin considering support and delivery options as it analyzes the course requirements. This section addresses the special considerations associated with the development and implementation of training programs delivered by means of instructional technology.

IT Considerations in the Analysis Phase

Phase 1: Analysis

The analysis phase is very complex. As you will see later in the section on project management, and again in Chapter 4, most project *planning* decisions are made during this phase. This is when the customer requirements are clarified and defined and plans are developed. Information is gathered through the needs analysis, task analysis, media analysis, audience analysis, infrastructure/ resource analysis, environmental analysis, cost analysis and other sources and processes to enable the IT team to design and develop instruction.

The primary focus of the analysis phase is to establish the boundaries of the instructional program, including:

- Type of learning required.
- Scope and sequence of the instructional content.
- Prerequisite knowledge and skill requirements.
- Optimum instructional media and delivery options.
- Optimum level of student interaction.
- Requirements and optimum processes for student practice.
- Feedback requirements.
- Pre-testing and testing strategies.
- Help functions.
- Support materials.
- Student tracking methods.
- Student data file requirements.
- Course data management requirements.

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The ISD Process and Instructional Technology (IT) (continued)

IT Considerations in the Analysis Phase (continued)

The IT team must evaluate the technical infrastructure and the hardware and software options carefully.

- The team will identify current and future hardware and software requirements and resources (including access to broadcast facilities, downlink locations, availability of adequate computers, etc.) and the pros and cons of various instructional technology options.
- It is usually not worth it to develop an instructional program in outdated software, just as it is usually not worth it to develop a program that is so state-of-the-art that it relies on hardware that is not available to the end users.

The IT team will examine the costs and benefits of each potential training solution and will strive to identify that solution that will deliver the greatest Return On Investment (ROI). That is, the team must define the approach that, given all of the training factors and constraints, will give the biggest "bang for the buck."

- Critical to the process of determining ROI is the accurate calculation of the costs of employing the instructional technology alternatives. The team will not be able to choose intelligently among alternatives if the cost of each alternative is not based on sound analysis. Chapter 4 identifies the cost factors that must be considered when comparing instructional technologies.

During this phase, the project manager and IT team will conduct the required DITIS and DAVIS searches, conduct COTS research, and identify development team training requirements. The project manager also implements the metrics program, the quality control program, and project evaluation procedures.

The selection of the correct medium/media is critical and it is during the Analysis Phase that this decision must be made. Guidance on media identification, planning, selection, and implementation are presented in this handbook. Chapter 3 identifies the media alternatives; Chapter 4 addresses the advantages and disadvantages of each medium; and the subsequent chapters discuss the use of the media alternatives. But the media selection and planning processes must be completed before the project moves into the Design Phase.

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The ISD Process and Instructional Technology (IT) (continued)

IT Considerations in the Design Phase

Phase 2: Design

- Because changes during the development and implementation phases are costly, the development team should use this phase to ensure all members of the project understand what the resulting instructional program will look like – before full scale development begins. The design phase documents how the instruction will look and function.
- Given the approved approach to training, the project manager should arrange for the required staff training (identified in the project planning) to enable the team to design and develop instruction for the selected media.
- The project manager will document the instructional strategy for customer review and approval. This is a high-level description of the design, including the look and feel, navigation, testing, etc. The customer will also review and approve plans for managing student data files.
- The team may create a prototype so the customer can actually review the "look and feel" of the design.
- Once the prototype and instructional strategy have been approved, the team creates flowcharts and storyboards.
- Flowcharts make it clear how the instructional and administrative elements will connect and how to navigate through the instruction.
- Storyboards should include screen text, graphics, audio/video scripts, branching instructions, and descriptions of functionality. High level scripts (outlines) for Interactive Video Teletraining (IVT) or Computer-Mediated Communication (CMC) instructors should be developed here. Templates and web page designs for Internet instruction should also be developed at this point.
- The customer's role as reviewer is particularly critical during IT design efforts.
  - The project manager should schedule walk-throughs and review sessions where the team explains to the customer and Subject Matter Experts (SMEs) the decisions made and materials developed.
  - The customer and SMEs have a responsibility to review the design deliverables (instructional strategy documents, flowcharts/ storyboard web page designs) thoroughly and provide timely, specific, constructive feedback.

Remember that developing a prototype is a good way for the customer to experience the team's vision of how the instruction should be presented. It can save valuable resources later. Be sure to avoid scope creep during this phase.

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The ISD Process and Instructional Technology (IT) (continued)

Instructional Technology Considerations in the Development Phase

Phase 3: Development

The length of the development phase depends on the complexity of the project and the accuracy and level of detail achieved during the design phase. Development activities include the pre-production, production, and post-production of the content and various instructional media elements including audio, video, graphics, animations, photos, and coordination of team resources.

- Depending on the complexity, this phase can involve graphic artists, producers, directors, editors, animators, narrators, programmers, quality assurance personnel, etc. all working at the same time to create the instructional media elements.
- The customer should provide existing instructional media such as photographs, videotapes, graphics, animation, and illustrations. All final instructional media elements must be reviewed and approved by the customer. At this point, changes are costly.
- One common problem during the development phase is that there are too many people with a variety of opinions regarding production details ("everyone is a director"). Therefore, the customer should designate one point of contact to represent the collective point of view in any situation.

During this phase, the development team should:

- Assemble all of the instructional media elements described on the storyboards into a fully functional application of instructional technology. This is a tedious and exacting process whether creating a videotape, interactive courseware, or presentation materials for the IVT instructor.
- Ensure the customer has the opportunity to review and approve all instructional media elements. The main purpose of these reviews is to make sure everything on the storyboards is in the instruction and that there are no discrepancies.
- Develop the instruction in increments so the customer can review each increment in progress as well as when completed. The team must be vigilant in the area of project scope, however, and not allow the customer to add requirements at this point.
- Plan for and document the quality control efforts during this phase. Be sure to conduct a summative evaluation at the end of the development phase to test IT products (especially important for IMI and IBI).

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The ISD Process and Instructional Technology (IT) (continued)

Instructional Technology Considerations in the Implementation Phase

Phase 4: Implementation

All the IT products are developed. The customer is satisfied with the product. The materials have been subjected to a rigorous quality control process. Now it is time to deliver the program. Hardware and software integration and compatibility, instructor and student comfort with the technology, and special preparation requirements all combine to create special challenges when the training is based on the use of instructional technologies.

- If the project involves technology insertion in the schoolhouse, the implementation phase may likely become the responsibility of the instructor or course owner.
- Most instructors are comfortable with traditional media and computer-based support materials. Even so, conduct a pilot course where instructors integrate the chosen media into the instructional program and develop an appropriate pace of instruction.
- During the preproduction phase for IVT, include rehearsals for instructors with the studio staff. Coach them on techniques such as maintaining eye contact with the camera, setting the stage for the students (helping them become comfortable with the use of the chosen media), and establishing clear-cut rules, procedures, and processes.
- Prepare the studio environment for live broadcast if applicable and conduct an equipment check well before, as well as just prior to broadcast.
- If the project is DL,
  - Ensure that the implementation process is continuously monitored by the appropriate support organizations. Be sure to maintain communications with supporting organizations. The failure to coordinate effectively is never more obvious than during the implementation phase.
  - Conduct final coordination with facilitators, field representatives, or site POCs and distribute all materials just prior to implementation (to ensure everyone has the latest version of the training materials).
  - Ensure appropriate student help is available for the duration of the implementation phase.

  (See the next section for information on special DL issues.)
- If not already done, the course owner must provide input to the Air Force Catalog (AFCAT), the Air Force Training Management System (AFTMS), and ensure course materials are fielded for student use.

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The ISD Process and Instructional Technology (IT) (continued)

Instructional Technology Considerations in the Evaluation Phase

Phase 5: Evaluation

Research indicates that the instructional format itself actually has little effect on student achievement as long as the delivery technology is appropriate to the instructional content and all students have access to the same technology. However, it is important to establish that the chosen media is the appropriate vehicle for the given instruction prior to implementation. An analysis of student data files after implementation will be key in determining the overall effectiveness of the IT program.

Formative evaluations should be used throughout the Analysis, Design, and Development Phases to verify that the selected media is effective in supporting the training objectives. Summative and operational evaluations will be the joint responsibility of the IT team, support organizations, and the course owner. The IT team must define and collect appropriate metrics data and forward necessary reports to senior management as requested. See the next section for information on metrics.

The following project management activities should be accomplished during this iterative phase.

- Monitor established milestones, budget expenditures, and development progress against what was planned.
- Compare estimated and actual ROI.
- Review instructional content and materials for accuracy, currency, and availability.
- Monitor processes to measure the impact of instructional technology on student performance and learning outcomes.
- Compile and analyze evaluation results. Analyze student data files.
- Document inspection and evaluation results, including course/instructional deficiencies, support system problems, administrative barriers, efficiencies realized (cost, labor, training time), and other metrics that could contribute to lessons learned and quality improvement of the instructional system.

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Section B

OVERVIEW OF PROJECT MANAGEMENT

Introduction

The desired result of the ISD process is customer satisfaction – which means the delivery of a cost-effective instructional program that adequately meets the established learning need and is provided to the right people at the right time. Project management is the means by which all the planning, analysis, development, implementation, and evaluation actions discussed in the previous section are coordinated and controlled. This section addresses first the planning that must take place before the project even begins and then defines the general management principles and processes associated with an instructional systems development project.

Project Planning

The Purpose

The Project Manager's primary tool is the project plan - its proper development and implementation are the keys to delivering a quality instructional program. The project plan can take any one of a variety of forms, from a formal deliverable to a folder that contains the agreed-to plan of action and milestones. The degree of formality is dependent on the scope and complexity of the project.

Regardless of the form it takes, project planning information must be documented — it is used to define the scope of the development project (including deliverables), the resources required to accomplish each phase of the project (including personnel and costs), and the project schedule. In this handbook, the term *project plan* refers to project planning documentation – however formal or informal.

The project plan is the vehicle used to confirm senior management and customer buy-in. It is worth the time it takes to develop, not only because it structures the program, but also because it serves as a convenient tool to make sure there is a common understanding between the development team and the customer about requirements, responsibilities, timelines, and expectations.

Note:

The scope of the project plan depends on the scope of the assigned tasking. If the scope of assigned tasking is limited to defining the instructional alternatives before the customer commits to the development effort, the scope of the project planning might be limited to the Analysis Phase. Once the customer has selected the solution (the desired approach) and expanded the tasking to include the actual development of the instructional program, the project plan is then updated to reflect the entire instructional system development effort.

The project plan is a tool.
It is up to the project manager to make it an effective tool.

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Project Planning (continued)

Prepare to Begin

The project manager begins by assembling all available data about the project.

- What does the team have to produce and how is it going to get there?
- How will the team know it is on track and doing a good job?
- What resources are required to get the job done?
- What are the points along the way where the customer will participate in the process?
- Who needs to be involved and what are their responsibilities?
- What is the experience level of the team?

Each of these questions must be answered and documented BEFORE the IT team gets authorization from senior management to begin its work.

Define the Project

There are six major steps associated with project definition.

Step 1	Identify customer requirements.
Step 2	Define the IT development process, from inputs to outputs of the development process.
Step 3	Define and establish required support processes.
Step 4	Define staffing and resource requirements
Step 5	Develop a master schedule.
Step 6	Obtain senior management buy-in.

Step 1: Identify Customer Requirements

In order to complete the most critical step in any development process – defining what is required – it is essential that the project manager correctly identify the primary customer. Who is it that must ultimately be satisfied with the product? While there are often several customers of instructional systems, the primary customer is the person or organization that retains decision-making authority. This usually is the training manager, course director, program manager, or an instructor who works directly with the career field functional managers.

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Project Planning (continued)

Identifying Other Customers

Other customers of the instructional system include the students, students' supervisors, other individuals who will work with students after they have completed their instruction, and the subject matter experts working with the project. In addition, senior-level managers, MAJCOMs, instructors, and support personnel are customers of the project team. Customer feedback throughout the life cycle of the instructional system is a critical component of the quality assurance process.

Defining the Customer's Needs

During the Analysis Phase, the requirements and views of each identified customer group must be solicited and defined – the better defined the requirements, the better the chances of fulfilling them successfully. It is impossible to design an adequate instructional system without defining these requirements. The data collected will feed the task, training situation, and media analysis processes as described in MIL-PRF-29612 and its supporting handbooks. Understanding the customer's requirements will help instructional designers determine the instructional delivery media best suited to the training situation and learning needs. Refer to Chapter 4 for a discussion of media selection criteria.

Obtaining and Keeping Customer "Buy -In"

The ultimate goal is a satisfied customer. And a customer who has helped make decisions along the way is far more likely to feel invested in the final product. The project plan should be built around customer reviews and feedback. If the customer disagrees with the team's solutions or ideas, it is better to find out and make adjustments early in the process. Surprising the customer is the surest road to failure – there is a chance s/he will be satisfied – but there is a greater chance that the team did not anticipate every decision the customer would have made.

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Project Planning (continued)

Step 2: Define the Development Process

First, the project manager must think through the entire project from the beginning through to delivery of the end product; it may be helpful to gather trusted advisors and conduct a brainstorming session. Think of the ISD process – what does the team have to do to get through the Analysis Phase? Refer to MIL-PRF-29612 and the supporting handbooks for a detailed description of the ISD tasks the team will have to complete.

List the steps, or tasks, required for each phase. Tailor the tasks as appropriate to the scope of the project. Make sure the inputs and outputs of the process are clearly defined – and that products to be delivered to the customer are identified. Once the list is completed, look at the whole list and make sure all tasks are included and that they progress logically from one to the next.

For each task, identify the following information:

Task Information	Description
Title/Name of the task	Keep It Short and Simple
Purpose of the task	Clearly state the purpose of the task – what is the value added to the project?
Steps necessary to achieve the task	These are subtasks and should be as detailed as is useful. They should be descriptive enough to enable a team member to understand clearly what must be done and how it should be accomplished. There is no need for micro-management, but there is a requirement for clarity. Include In-Process Reviews (IPRs) with the customer and consultations with Subject Matter Experts as well as internal quality control reviews. Include recurring and periodic reports under a project management task; development of such reports takes time and staff resources.
Products resulting from the task	Include draft deliverables and interim deliverables such as sample lessons.
Documentation used in developing the products	Include reference materials, technical manuals (make sure the team has the latest version), Instructional Technology data (information on the technologies and equipment systems to be employed for development and delivery of the product), etc.

Continued on the next page

Project Planning (continued)

Task Information	Description
Skills required to accomplish the task	Identify by job and skill level (e.g., Senior Instructional Designer).
Other resources required to accomplish the task	Support tools, software, etc.
Organizations/ Agencies with which the project must interface to accomplish the task	Include internal and external organizations and agencies; identify the points at which interface is essential.
Review and approval process for the task/deliverable	List all reviews (internal and external) and estimated time each cycle will take.

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Project Planning (continued)

Step 3. Define and establish required support processes

There are a number of support processes that must be defined before the planning process is completed. By defining the requirements associated with quality assurance and metrics programs early in the planning process, the project manager ensures that such processes are an integral part of the program and that necessary resources are allocated.

Establish a Quality Assurance Program

Quality assurance is the organized creation of beneficial change to the process of designing and developing products, whether an instructional program or an aircraft. The objective of quality assurance is to foster improvement in the process and products as they are being designed and developed rather than waiting until after they are implemented. It has become a primary function of Project Management.

Each phase of the ISD process is designed to force project managers and designers to ask the right questions to help focus on the effectiveness of the instructional system – to force them to ask whether some aspect of the system could be improved. Customer satisfaction is the number one goal; and customer satisfaction translates into meeting instructional requirements in the most effective and efficient manner possible.

Continuous improvement of Air Force instructional programs is essential to the readiness of our forces. With decreasing manpower and budgets, instructional designers must find more effective and efficient ways to maintain the skills of Air Force personnel. A proficient project manager will make quality assurance an integral part of the instructional system life cycle management process (from inception through retirement).

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Project Planning (continued)

Develop Quality Control Procedures

The Quality Control (QC) process, part of the quality assurance program, must be an integral part of the project. The QC procedures should be updated throughout the project to ensure that lessons learned in one part of the project are applied to work remaining to be accomplished. Include the following in the QC procedures:

- Establish a review and approval process to make sure that all products meet quality standards. A form documenting a deliverable's progress through the QC process should be developed and retained with the deliverable files.
- The review and approval form should be filled out and attached to each product associated with a lesson. As the product is reviewed and approved, the approving authority should sign the document. The document should be complete for each product associated with the lesson. The primary author should date the form to tell the reviewer when the review must be completed. The form should not be signed until all suggested corrections are made, checked, and approved. Disapproved products should be returned to the author for correction.
- QC is the collective responsibility of the entire development team. Each member should be assigned specific review and approval duties.
- Make sure the quality control steps for each task are included in the project planning.

Develop Project Metrics

Establish the means by which project progress will be measured. Some organizations have established reporting processes that dictate the data the project manager needs to collect, analyze, and present to senior management and the customer. Metrics and reporting requirements for DL projects have been defined by the AFDLO. The project manager should investigate current requirements before establishing and integrating a metrics program into the project.

Track Costs

Make sure you have a process to collect and track costs associated with the project. You will have to estimate costs prior to initiating an IT project and monitor actual costs associated with project development. More information on cost analysis and cost models is included in Chapter 4.

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Project Planning (continued)

Step 4. Define Staffing and Resource Requirements

The required skill levels for each task were defined during the initial step in this process. They indicate the type of expertise needed for the project team. The required implementation date directly affect the number of people required. Given enough time, one highly skilled person could probably develop an entire IT program. However, there is usually a point at which assigning more people to a task does little or nothing to accelerate the schedule. Therefore, scheduling constraints must be identified early in the process. Be prepared to recommend contract and outsourcing options if in-house resources are scarce.

Given the tasks, the skill requirements, and the schedule, identify the numbers of people required to accomplish each task. *Don't forget to identify the staffing requirements for life-cycle maintenance of the course after the IT product is implemented.* Sometimes senior management will require that staffing requirements be expressed in hours, other times they require that staffing be expressed as FTEs (Full Time Equivalents). The bottom line is that the project manager must determine how many people and what skill mix are required to accomplish each task.

The project manager will map out a staffing requirements chart which shows when the various staffing resources are required to support the established schedule.

Refine Team Composition

Once all of the tasks are analyzed to define staffing requirements, it is good practice to back up and look at the staffing plan as a whole. Review the tasks, schedule, and staffing plan. Look for ways to realize efficiencies.

- Can tasks be staggered more effectively to make better use of staff ?
- Are there coordination or support functions that have been overlooked?

The challenge is to optimize staffing resources – to have enough staff so that the work can be accomplished without driving everyone over the edge, but to tailor the process and staffing carefully enough so that team members are not sitting around waiting for others to finish their tasks.

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Project Planning (continued)

Define IT Team Positions and Responsibilities	With staffing requirements defined, identify the general roles and responsibilities of each position. Team member position descriptions may be modified to accommodate the individual strengths and weaknesses of team members as the development team evolves. The project plan is also the place to explain how the staffing resources will be organized. Subteams should be identified and associated responsibilities defined. More information on IT Team composition is included in Section C.
Identify Resource Requirements	Identify other resources needed for the project. Be sure to include facilities and equipment requirements, needed software and development tools, and services or resources needed from support organizations.

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Project Planning (continued)

Step 5. Develop a Master Schedule

The project manager must identify any scheduling or time constraints that impact the staffing and resource requirements. Include any events that will affect the development schedule. Often, there is a target date by which the instructional program must be delivered (e.g., for an equipment maintenance-training program, the training schedule might be driven by the delivery of the new equipment system to the initial installation site).

Working back from the required delivery date, define the schedule for each task. Some tasks can be done concurrently while others are dependent (when the results of one task must be available before another task can begin). Include the review and approval cycles for each deliverable.

Based on the length of time it will take to accomplish each task, identify the start and end dates. This is usually developed using a scheduling software package, but can be accomplished manually on graph paper.

When the project schedule is drafted, examine it carefully and make sure it makes sense. Make adjustments based on revised task sequencing and dependencies. Software tools can be used to develop GANTT or PERT charts that reflect task sequence and dependency.

Incorporate Staffing and Resource Requirements

Insert staffing and resource requirements data into the schedule. This is a critical component of the project plan. The master schedule should give a clear overview of what needs to be accomplished, when it will be accomplished, who is responsible for accomplishing each task, and when the customer and SMEs will participate in the process. Validate and adjust as necessary the staffing resources assigned to each task.

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Project Planning (continued)

Step 6: Obtain Senior Management Buy-in

The project manager must ensure that managers and customers understand the scope of the project and the impact it will have on manpower, budgets, and schedules. The best way to ensure customer and managerial support is to obtain their approval of the project plan. The first step in getting buy-in is to establish a reasoned, well-planned view of the proposed project.

Assemble the Project Plan

Assemble the data to tell a solid story. Include the following:

- What does the team have to produce and how is it going to get there?
  - Task list
  - Deliverables
  - Life-cycle support
  - Development team structure
- How will the team know it is on track and doing a good job?
  - Master schedule (GANTT or PERT charts)
  - Internal evaluation procedures/Quality assurance program
  - In-process reviews with the customer
  - Project metrics
- What resources are required to get the job done?
  - Staffing
  - Facilities/Equipment/Networks
  - Software/Development tools
- What are the points along the way where the customer will participate in the process?
  - Review and Approval Cycles
  - In-Process Reviews
- Who needs to be involved and what are their responsibilities?
  - Coordination with other organizations/agencies
  - Upper management responsibilities
  - Customer/SMEs

Remember, this information can be compiled into a formal Project Plan, a Plan of Action and Milestones (POA&M) chart, listed in an MOA/MOU with the customer, or summarized in a briefing for senior management. In any event, the project manager and the development team will use the planning documentation on a daily basis – its form should support that purpose.

Continued on the next page

Project Planning (continued)

Management "Buy-in"

The project manager may be required to submit the project planning documentation for internal review and approval before it is formally reviewed with the customer. It is the project manager's responsibility to ensure that all senior management questions are adequately addressed.

Keeping management informed is the key to success. Submit both formal and informal reports to senior management to make sure they know how hard the project team is working, how well the project is being managed, how pleased the customer is.

But don't hide bad news. Don't let issues grow until they are full-blown problems. Define the problem carefully and develop a plan of action for addressing it. Explain the risks and costs and explain why this approach is the best way to solve the complete problem.

It is important to recognize that the morale of the entire project team can be deeply affected by the way management views the project. Get senior management involved early and then maintain the dialog. Let them know the project team values their advice and support.

Commitment of Resources

Obtaining resources frequently requires endorsement or approval of senior management. It is prudent project management to involve senior management early, to identify project support requirements early and clearly, and to keep senior management informed about issues before they become problems.
The course owner or customer can often help identify (and emphasize to senior management the importance of) support resource requirements.

Identify and obtain senior-level management endorsement or approval for:

- Purchasing hardware, software, or curriculum materials.
- Training for the project team.
- Facility resources.
- Manpower and support personnel.
  - Selection, training, and assignment of personnel.
  - Obtaining assignment longevity/commitment of personnel resources.

Continued on the next page

Project Planning (continued)

Summary of Project Planning Activities

The following list summarizes the planning activities accomplished by the project manager. It provides some reminders and key points to consider while developing and managing the project plan.

- Validate the instructional need.
- Analyze alternative media solutions to the instructional problem; conduct cost/benefit and ROI analyses to define the optimum IT solution. Identify the recommended solution in the project planning documentation. (See Chapter 4).
- Identify management constraints (including cost and schedule constraints) that could affect development and implementation of the instructional system.
- Develop and document the management strategy for the development, implementation, and life cycle support of the instructional system.
- Develop a POA&M for each phase of the project to reflect all associated tasks and the related task performance schedule.
- Identify staffing requirements and establish project team membership; ensure appropriate cross-functional representation (e.g., subject matter experts, user group representatives, instructional designers, graphic artists, evaluation specialists, and technical writers). Plan for any additional staff training, if necessary. (See next section on Instructional Technology Teams).
- Define team operating guidelines and clarify roles and responsibilities. Monitor the team to ensure all members fulfill his/her responsibilities.
- Make recommendations for contracting out the project if in-house resources are inadequate to meet the need in the specified timeframe.
- Identify and establish liaison with related support organizations (e.g., faculty development, information management, and facilities).
- Ensure the project planning documentation incorporates an appropriate quality assurance program to include formative, summative, and operational evaluations.

Continued on the next page

Project Planning (continued)

Summary of Project Planning Activities (continued)

- Ensure project planning documentation reflects on-going customer involvement in the design, development, and implementation of the training program through periodic reviews and working sessions.
- Plan for system resource requirements including funding, equipment, personnel, facilities, and maintenance. Plan to monitor resource utilization throughout the project cycle and track project costs.
- Plan for the certification of instructors and instructors' supervisors, site and subject-matter facilitators, and continuation training programs to ensure continued qualification of the instructional staff.
- Establish a metrics program. Determine what data will be collected, who the recipient of the data will be, how often it needs to be collected, where it needs to be collected from, and what the purpose of the data is (what it will be used for). Allocate resources for metrics program design and implementation as well as data collection and processing.
- Obtain senior management and customer approval to implement the project plan. Keep them in the loop throughout the project.
- Implement the plan and manage the ISD process.
- Provide briefings on the status of the project and adherence to the project plan.
- Avoid scope creep. Do not allow the customers or a creative development team to add unnecessary bells and whistles or to broaden the scope of the project without solid justification.
- When things change (as they always do), assess the impact on scheduling and budgets. Do not incorporate the change until required contractual actions have been completed. Once management has approved the change, adjust the project plan accordingly.

Section C

The Instructional Technology Development Team

Introduction

The project manager must identify special skills required to fulfill project requirements. This presents special challenges to the manager of an Instructional Technology project. This section explains the special skill sets that may be required for successful development and implementation of an IT program. It is provided to help the project manager tailor the skill mix of the IT development team to the unique features of the project. This section also provides suggestions for getting the IT development team organized and off to a solid start.

IT Team

The development organization should have a core management team that serves to organize and coordinate all IT resources regardless of the type of IT project. The IT Team comprises key members who ensure the following essential functions are established and coordinated (some members may oversee more than one function).

IT TEAM	
Role	**Responsibilities**
Project Management	This function ensures the capability to direct the overall development process, including coordination of projects with senior management and support organizations. A project manager is assigned for each project.
Subject Matter Expert (SME)	This function coordinates the identification and provision of subject matter expertise. SMEs are those who have a thorough knowledge of a job, tasks/duties, or a particular topic and are qualified to assist in the instructional development process. SMEs review lessons and instructional material for technical accuracy and currency. They may also author lessons as required.
Instructional Design	This function ensures the capability to develop standards and instructional strategies for lessons. Instructional designers may assist with lesson authoring when required. They review completed lesson designs, flowcharts, and storyboards for instructional integrity and conformance with standards and strategies.
Instructional Development	This function ensures the capability to author lesson designs, flowcharts, and storyboards for the selected medium. Instructional developers design and/or create static and animate graphics, performance exercises, simulations, and interactive sequences. They also program lessons with authoring systems, write scripts and narration, develop home pages and hot links, etc.

Continued on the next page

IT Team (continued)

IT TEAM	
Role	**Responsibilities**
Registrar	This function ensures the capability to register students properly for a course, track student progress through a course, and update student records.
Visual Information Support	This function ensures the capability to develop and control audio-visual material such as slides, film strips, audio tapes, and video clips. Visual information support specialists manage audio-visual equipment, broadcast facilities and video production capabilities. They also assist with graphics support.
Quality Control	This function ensures the capability to establish procedures for the continuous monitoring of ISD processes and the review of all materials and products produced by the IT development team.
Evaluation Support	This function ensures the capability to establish and implement an evaluation program. Evaluation support specialists develop processes and materials to gather information about student performance and satisfaction. They also assist with overall program evaluation and the collection of metrics data. Usually this function is performed by course directors, training managers, instructors, or a formal office to identify standards and evaluation processes.
Student Support*	This function ensures the capability to assist students with administrative functions and help solve technical problems that students have. Student support specialists may establish an electronic "help desk", or on-line support provided throughout the implementation of a training program.
Production, Editing and Distribution*	This function ensures the capability to produce, duplicate and distribute course materials to students or remote-site locations. This may involve editing, formatting, and production of print materials, computer discs, or electronic publications.
DL Site Administration*	This function ensures the capability to schedule and implement DL courses in the field, usually at base-level DL Centers within the educational services office (ESO) or through a Job Site Training POC.

* - denotes functions of particular importance to DL

IT Development Team Roles and Responsibilities

Define Functions and Responsibilities

In the project definition phase, the project manager identified the staffing requirements for the specific IT project. Now a development team must be put together.

Each development team comprises members who perform different functions. They come from academic, technical, support, contract organizations, etc. to ensure a systems approach to project development and execution.

A team member's assigned responsibilities should be based on his/her individual area(s) of expertise related to the type of instructional technology used in the project. Some members may perform more than one function. If the project is large is scope, several people may be required to perform the same function.

Whatever the team composition, the project manager must ensure that roles and responsibilities are clearly defined. Only then can subteams and team members begin to function effectively and be held accountable.

These functions are a guide. Based on available manpower, some team members may fulfill multiple functions.

The following paragraphs identify the special skill sets that will be required to develop and implement various instructional technology programs. These descriptions are provided as a checklist for the project manager as s/he refines the composition of the development team. The use of these resources may be coordinated through the IT Team.

Specialized Skill Sets

Special Skills Depending on the IT employed, the development team will require specialized expertise. The following charts identify the key skills required for each of the technologies addressed in this handbook. Multiple skills may be provided by an individual, depending on the scope of the IT project and the skill set of the individual.

CMC Functions For a Computer Mediated Communication development project, the development team may require the following additional functions.

CMC FUNCTIONS	
Role	**Responsibilities**
Instructor	Hosts the learning session. Defines ground rules, introduces thread, guides discussion, asks questions, integrates responses, summarizes and ends session.
Support Staff	Handles the administrative actions needed to support a computer mediated conference such as taking registration, mailing instructional materials, publishing the help desk number, compiling critiques, etc.
Instructional Designer	Develops standards and instructional strategies for computer mediated conferencing lessons. Assists with lesson authoring when required. Reviews completed lesson designs and flowcharts for instructional integrity and conformance with standards and strategies.
Courseware Developer	Authors lesson designs and flowcharts. Designs and creates performance exercises, simulations and interactive sequences.
Webmaster	Works with the courseware developer and instructional designer in the creation of the course by providing technical assistance for Web issues.
Help Desk	Is available up to 24 hours a day to handle technical questions or problems for both instructors and learners.

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Specialized Skill Sets (continued)

Interactive Audioconferencing Functions

To conduct an interactive audioconference (either as technology insertion or DL), the IT development team may require the following additional functions.

INTERACTIVE AUDIOCONFERENCING FUNCTIONS	
Role	**Responsibilities**
Moderator	Hosts the learning session. Conducts roll calls, introduces speakers, defines ground rules, guides discussion, defines breaks, summarizes and ends session.
Support Staff	Handles the administrative actions needed to support an interactive audioconference such as taking registration, mailing instructional materials, reserving and publishing the audiobridge number, establishing the conference call, compiling critiques, etc.
Content Expert	Can be the course instructor or a guest speaker.

IMI Functions

For an Interactive Multimedia Instruction development project, the IT development team may require the following additional functions.

IMI FUNCTIONS	
Role	**Responsibilities**
Courseware Developer	Authors lesson designs, flowcharts, and storyboards. Designs and/or creates static and animate graphics, performance exercises, simulations, and interactive sequences. Programs lessons with authoring systems.
Courseware Programmer	Programs lessons with authoring systems or programming languages. Develops static and animated graphics with authoring languages. Assists in converting American Standard Code for Information Exchange (ASCII) code when automatic conversion is unavailable. Develops subroutines and writes applications to read/analyze student data files.
Graphic Artist	Develops graphics, and is the advisor for visual conventions.
Media Specialist	Films motion and still-frame sequences. Coordinates audio narration. Assists in planning pre-master media layout.

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Specialized Skill Sets (continued)

IVT Functional Team

For an Interactive Video Teletraining development project, the IT development team may require the following additional functions.

INTERACTIVE VIDEO TELETRAINING FUNCTIONS	
Role	**Responsibilities**
Scheduler	Schedules uplink/broadcast facilities for rehearsals and broadcasts. Ensures that downlink facilities are identified and scheduled to receive programs. Also, schedules programming with satellite/network manager. Enters program schedule into annual and quarterly DL Guide.
Instructor	Presents live instruction to DL audience using teaching skills and techniques suitable for IVT delivery. Usually a subject matter expert who has completed the required IVT instructor course and understands the dynamics of this instructional environment.
Producer/Director	Actually puts the live broadcast out to the network. Works with the instructor to ensure best delivery of lessons, recommends corrections to slides and graphics not designed for TV, edits prerecorded videos, and designs and produces video graphics. Conducts training for new instructors.
Videographer	Operates camera during the actual broadcast unless remote cameras are used.
Engineer/ Equipment Maintainer	Keeps video and related equipment in good working condition. Talks with the network management center (satellite manager) to ensure proper broadcast electronics to the satellite. Operates audio bridge during live broadcast. Works with downlink sites to ensure proper alignment of equipment, and to help identify downlink IRD numbers and POCs.
Production Assistant	During live broadcast is responsible for audio output, graphic generator, videotape inserts, clock and video taping of broadcast.
Broadcast Center Manager	Overall manager of the studio. Usually schedules equipment, personnel, and equipment purchases and may serve as program scheduler. Develops procedures for quality control and customer satisfaction. Maintains records for studio utilization, costs, and other metrics data.
Subject Matter Facilitator	Facilitates instruction at a downlink site through such things as overseeing special projects or practical exercises, observing hands-on activities, facilitating guided discussion, monitoring tests, and answering questions. Usually this person has completed special training or certification prior to assuming this role.

Continued on the next page

Specialized Skill Sets (continued)

INTERACTIVE VIDEO TELETRAINING FUNCTIONS	
Role	**Responsibilities**
Job Site or DL POC	Organization or person at base level responsible for all aspects of Technical Training DL administration.
Site Coordinator or Site Monitor	Person at base level who ensures the downlink classroom and equipment are ready to use. Assists Job Site or DL POC or Subject Matter Facilitator in using the classroom equipment and by providing minor administrative support.

IBI Functional Team

For an Internet-Based Instruction development project, the IT development team may require the following additional functions.

INTERNET-BASED INSTRUCTION FUNCTIONS	
Role	**Responsibilities**
Webmaster	Manages the Web site. Provides configuration control of Web based content and maintenance of information presented. Develops procedures for quality control and customer satisfaction.
Server/Systems Administrator	Responsible for information security and stability, as well as hardware/software management. Maintains network system and trains staff on use.
Programmer	Programs lessons in selected authoring languages (e.g., HTML, Java, ActiveX). Integrates media and source materials into structured instructional format. Develops subroutines.
Authoring System Specialists	Ensures compatibility and compliance with established standards. Selects media presentation techniques and software. Implements programming standards and guidance in the development of new courseware, as well as conversion of existing courseware.
Graphic Artist	Develops graphics and media content in the appropriate format utilizing compression and optimization techniques. Advisor for visual conventions. Ensures graphic conventions and screen presentation quality and consistency.
Instructor	Subject matter expert who has completed the IBI instructor course and understands the dynamics of this instructional environment; responsible for coordinating the learning process. Can communicate with students on-line via e-mail or via other media (may establish supporting audioconferences to discuss related topics with groups of students).
Help Desk	Provides responsive support (either on-line or via e-mail) to student questions about system operation. Requires internet expertise as well as expertise on software application(s) employed.

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Specialized Skill Sets (continued)

QC Team Responsibilities

While quality control is the collective responsibility of the entire IT development team, each member should be assigned specific review and approval duties. The following chart provides examples.

QUALITY CONTROL RESPONSIBILITIES OF IT DEVELOPMENT TEAM MEMBERS			
	A	B	C
	Position Title	**Quality Control Responsibility**	**Significance of Review and Approval Sign-Off**
1	Courseware developer	Authors an easy-to-understand, technically accurate lesson that is consistent with design documents.	Product has been reviewed and is judged to be satisfactory and consistent with design documents.
2	Instructional designer	Reviews lesson products for instructional integrity and conformance with design documents.	Product has been reviewed and is judged to be instructionally effective and consistent with design documents.
3	Subject matter expert	Reviews lesson products for technical accuracy, currency, and completeness.	Product has been reviewed and is judged to be technically accurate, current, and complete.
4	Courseware programmer	Programs lessons according to design documents and storyboard instructions. Assists in the development of clear, easy-to-read graphics according to storyboard instructions. Checks all lesson paths, especially in test and evaluation components.	Operational lesson has been reviewed online and is judged to be "bug"-free and to operate as specified. Static graphics are clear; animated graphics operate as specified and correct video and graphics are called into lesson at the correct location.
5	Graphic or computer artist	Develops clear, uncluttered, easy-to-read graphics according to storyboard instructions.	Online graphics have been reviewed and are judged to be correct, clear, and easy to read.
6	Media specialist	Produces high quality, clear videotape according to shot list and storyboard instructions.	Videotape has been reviewed and is judged to be high quality.
7	Quality specialist	Reviews lesson products for instructional integrity and conformance with design documents.	Product has been reviewed and is judged to be instructionally effective and consistent with design documents. Operational lessons are user-friendly and consistent.

Support Functions and Organizations

The development of an instructional program often requires the support of other organizations. The following table lists the major functional groups and organizations with which the project team may need to interface. It is important that the IT development team utilize experts from these areas as appropriate. The use of these resources is also coordinated through the IT Team.

Organization	Related Functions
Civil Engineering	• Constructs training and support facilities such as classrooms and test pads • Modifies existing facilities (e.g., adding new electrical outlets and air conditioning, building multimedia labs).
Resource Management	• Provides human resources (e.g., instructors, instructional system designers, maintenance personnel, and database developers). • Manages training and support equipment. • Provides funding for day-to-day operations.
Information Management	• Edits instructional material such as student workbooks and student study guides. • Produces instructional material such as student handbooks and plans of instruction.
Contracting	• Develops contracts for courseware development, maintenance, and other services. • Processes local purchase forms to procure equipment and supplies. • Processes outsourcing and privatization efforts.
Maintenance Organization	• Performs quality assurance inspections on instructional, support, and test equipment. • Performs scheduled and unscheduled maintenance on instructional, support, and test equipment. • Fabricates trainers and training aids.
Communication and Computers	• Manages local communication network and infrastructure. • Develops and implements plans for local network expansion, integration, and interoperability.

Establishing The IT Development Team

The master schedule has been developed. The skill set requirements have been defined. The roles of all project team members have been clearly delineated. Senior management and the customer understand and concur with the project plan. It is now time to assemble the development team, share information on the project, obtain support tools, and define staff training requirements. In brief, the development team must get ready to implement the project plan. This section includes guidance for establishing and preparing the project team.

Implement Staff Training Requirements

The key to determining team members' training requirements is to examine the background of each team member. If members do not have experience with the specific technology and/or tools being used on the project, they are likely to need some training. For example, before beginning the design phase for IVT development, instructors, instructional designers, and instructional developers should attend the video teletraining/teleseminar course.

The project manager should develop a list of recommended staff training and review it with each team member – the best source of information in this case is the individual team member. The cost of staff training must be factored into the overall project budget.

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Establishing The IT Development Team (continued)

Conduct The Kick-off Meeting

The project manager should have met with each member of the development team to clarify roles and responsibilities and define training requirements. The purpose of the kick-off meeting is to assemble the team and begin the process of integrating the team resources.

In order to perform effectively, the members of the IT development team must:

- Include and instructor skilled in the given technology.
- Know the subject (SME participation is critical).
- Know what is expected of the team as a group as well as the nature and scope of each individual's responsibilities.
- Know what products are required, and when they are to be delivered.
- Know how products will look and function within the user organization or DL environment.

The development team members will need copies of documents that explain how they are supposed to do their jobs. They should also receive documents that are required to develop the training program. These documents include the following:

- MOU with customer
- Project planning documents
- Development process outline
- Quality control procedures
- Support tools and documentation (e.g., hardware/software and user's manuals)

The kick-off meeting is the time to review the project planning with the staff, clarify roles, responsibilities, timelines, and expectations, and ensure that the team composition is appropriate for the effort.

Note:

It takes time to build an effective team. The project manager might consider using a trained facilitator to orchestrate the kick-off meeting. The facilitator could help the team define its goals, ground rules, and essential team processes.

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Establishing The IT Development Team (continued)

Meet the Customer

Inviting the customer to meet the development team helps both the customer and the development team members. The customer has an opportunity to discuss his/her view of the project and to express any concerns about pressures or constraints. The development team members get to see the person they are working for and to hear firsthand what the customer thinks. This meeting may be the appropriate forum for the following actions:

- Introduce the staff and summarize the skills of each member in terms of what s/he brings to the team.
- The development team will explain the process and the services they provide. If there are any questions about roles and responsibilities, now is the time to answer them and to work out any problems.
- Conduct a question and answer session. Discussing – and documenting – the issues up front will avoid misunderstandings later that could seriously affect production, milestones, and the delivery schedule.
- Make sure all members of the team understand the customer's requirements.

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Establishing The IT Development Team (continued)

Clarify Customer Responsibilities

The customer has certain responsibilities. Often they are included in a written MOU and reviewed at the kick-off meeting. The customer should agree to the following roles and responsibilities during the planning phase:

- Designate one point of contact for the project (customer representative).
- Commit to spending a considerable amount of time working on the project, especially in the early phases.
- Provide the development team access to the target audience.
- Provide timely and complete access to all course documents, systems, and other information requested by the team.
- Dedicate the appropriate number of SMEs for the life of the project - substituting SMEs will significantly delay delivery.
- View as many instructional media products as possible to determine what design or structure works for the course content. Make preferences known at the beginning of the project.
- Set aside time to thoroughly review all deliverables (storyboards, flowcharts, graphics, scripts, etc.)
- Give specific, constructive feedback and include examples.
- Be flexible! Circumstances change frequently and rapidly.
- Avoid scope creep (expanding the scope of the project).
- Alert the project manager to any new developments or course changes (planned or actual) that may impact the project.
- Ensure proper coordination with higher headquarters and functional managers.
- Take action to input new course information and changes into the Air Force Catalog of Formal Schools (AFCAT), the Air Force Training Management System and broadcast schedules as needed.
- Ensure course materials are fielded for student use.
- Market new DL courses and programs to the DL community.
- Conduct operational evaluations and give feedback to the team.

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Establishing The IT Development Team (continued)

Refining IT Development Team Composition

Once all of the tasks are analyzed to define staffing requirements, it is good practice to back up and look at the staffing plan as a whole. An IT development team must meet these general requirements:

- Must have a variety of experiences in Instructional Systems Development (ISD).
- Must include members who have expertise in the selected instructional technologies to be developed.
- Should be scaled to the size and scope of the project and include enough people (manpower) to meet critical deadlines.

Section D

DISTANCE LEARNING PROJECT MANAGEMENT

Introduction

The management of a Distance Learning (DL) project requires all of the diligence described in the previous sections on project management. However, there are special considerations associated with DL, and the project manager must ensure that all of these factors are reflected in project planning documentation. This section describes those peculiar aspects of DL that must be considered when planning the project and allocating resources. It also addresses the metrics associated with assessing the effectiveness of the DL program and special issues associated with the conversion of conventional training programs to DL format.

What's Different

DL simply means that the student and instructor are separated. Virtually any media can be employed for DL - correspondence courses can use paper or computer-based training, an instructor using IVT can employ videographs, videos, or audiotapes for reinforcement, etc. The development of a DL training program must be based on the selection of the media appropriate to the instructional objectives and training environment. Chapters 5 through 9 detail the special considerations associated with the selection and use of the various instructional technologies.

When planning to implement a DL program, the development team must be sensitized to the DL environment; learning strategies appropriate to that environment must be incorporated into the program. For example, the students must be allowed to become comfortable with the delivery medium. The instructors must learn to make the most of the instructional technologies – it takes practice to talk to the camera and teach with little, if any, immediate student feedback.

A solid understanding of the DL learning environment is a critical component of the DL project manager's tool kit.

Understanding the DL Environment

DL Planning and Organization

In developing or adapting distance instruction, the instructional objectives often remain basically unchanged, although content presentation requires new instructional strategies and additional preparation time. The planning phase of DL project management must be used to identify and define all obvious and hidden costs and resource requirements. The project manager should be versed in instructional technology options and their use in the DL environment.

DL Planning and Organization	
Strategy/Guidance	**Implementation/Impact**
Begin the course planning process by studying distance education research findings.	Appropriate research facilitates the identification of resource requirements and lessons learned that may be applied to the project being planned.
Before developing something new, check and review existing materials for content and presentation ideas.	There may be modules already developed that could be incorporated in part or in their entirety into the new IT program thus reducing development requirements. New presentation concepts can increase the effectiveness of training and add to the inventory of presentation options. Adequate research time should be built into the schedule to assess existing military and commercial courseware inventories.
Analyze and understand the strengths and weaknesses of the possible delivery systems available (e.g., audio, video, data, and print) not only in terms of how they are delivered (e.g., satellite, microwave, fiber optic cable, etc.), but also in terms of learner needs and course requirements before selecting a mix of instructional technology.	By fully understanding the options and examining them in light of requirements, the development team can make better recommendations about appropriate presentation and delivery options. The project manager should ensure that research materials are readily available to the development team. Research can be conducted in the field as well as at the development site; an on-site visit to a DL site targeted to receive the DL program may be extremely valuable to the development team.
Hands-on training with the technology of delivery is critical for the development team, the teacher, and the students.	Factor in time for the development team to practice with the delivery technology so that they gain an appreciation of the teaching and learning environments. Ensure the team has access to both the transmission and receiving equipment systems.

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Understanding the DL Environment (continued)

DL Planning and Organization	
Strategy/Guidance	**Implementation/Impact**
Make sure each receiving site is properly equipped with compatible, functional equipment.	As part of the analysis process, the team will identify constraints. The ability of target sites to receive the instruction is a critical factor; system capabilities of the target sites must be thoroughly documented. If target sites have different capabilities, the customer will decide whether to develop the training program to the lowest technical capability or to develop different DL programs for those sites with limited capabilities. Such factors are considered in the cost/benefit and Return On Investment (ROI) analyses.
Define the services offered at the receiving sites.	The extent to which the DL course must provide administrative information, IT familiarization, facilitators, and other support features is defined by the support structures provided by the receiving sites. Support service requirements should be defined by the development team and then matched to the capabilities of the receiving sites. The results of this analysis must be factored into the recommendations made to the customer regarding the design of the training program.
Plan to start off slowly with a manageable number of sites and students. The logistical difficulties of distant teaching increase with each additional site.	While this is a customer decision, the development team can assist by running practice and pilot courses where the training program is tested thoroughly for content, presentation and instructional effectiveness. Such an approach must be factored into the project plan and requisite resources must be budgeted.

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Understanding the DL Environment (continued)

Meeting Students' Needs

In order to enhance the effectiveness of a DL program, it is important to understand the challenges students face in the DL environment. Mechanisms for interactivity can be built into the training program to facilitate student receptiveness to learning – this will result in increased training effectiveness. The program manager must be sensitive to the need to budget time for ensuring that student considerations are adequately incorporated into the training program.

To function effectively, students must become comfortable with the nature of teaching and learning at a distance. The selected delivery system should be the one that will best motivate and meet the needs of the students, in terms of both content and preferred learning styles.

When planning the DL training program, a process must be established to help students resolve the technical problems that will arise. The process should reflect a focus on joint problem solving, not placing blame for the occasional technical difficulty. Time and resources must be allocated for developing these student-interface processes.

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Understanding the DL Environment (continued)

Meeting Instructors' Needs

Some media require live instructors. Factoring the needs of the instructors into the IT program also has implications for the planning, design, development, and implementation of DL instruction. For the most part, effective distance teaching requires the enhancement of existing skills rather than developing new abilities. However, there are some considerations that will help make the instructors more effective.

Meeting Instructors' Needs	
Strategy/Guidance	**Implementation/Impact**
Realistically assess the amount of content that can be effectively delivered in the course. Because of the logistics involved, redesigning, developing and presenting content at a distance is usually more time consuming than for the traditional classroom.	Structure the course into realistic "chunks" that can be assimilated by students. Build in frequent feedback mechanisms to maintain student involvement and assess "learner saturation" (when too much content is provided to students). Build summaries into the training to help students digest what they have learned. Incorporate the resources required to design and develop feedback materials and mechanisms into the project plan. Include these materials/mechanisms in the evaluation process.
Diversify and pace course activities and avoid long lectures. Intersperse content presentations with discussions and student-centered exercises.	This is related to "chunking" the information into realistic content blocks and making sure the student is still involved in the training program from time to time. Employ a variety of presentation styles, media, and interactive techniques to maintain student attention and interest. The design, development, and distribution of multi-media solutions have cost and schedule impacts. Also consider the additional development expertise that might be required to support development of a highly varied program of instruction. The alternative solutions should include a variety of approaches to meeting the need for instructional vitality.
Consider using a print component to supplement non-print materials.	Print materials are usually cost-effective to develop (compared with other support media). There may, however, be additional logistical issues associated with distributing print materials to DL receiving sites – these issues must be defined and accommodated in the planning process.
Provide DL techniques to the instructor staff (e.g., use short, cohesive statements and ask direct questions, realizing that technical linkages might increase the time it takes for students to respond).	Budget resources for the development and practice of these techniques.
Involve instructors in the planning and development processes -- get their buy-in and address their concerns.	Include review and working group sessions in the project plan. Budget the resources necessary to support the preparation of materials for these sessions and ensure time is incorporated into the schedule to permit development team members to participate. Also factor in the time and resources necessary to incorporate review comments. Refer to sections 2.B and 2.C on customer, instructor, and subject matter expert involvement in the analysis, design, and development processes.

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Understanding the DL Environment (continued)

Improving Interaction and Feedback

Using effective interaction and feedback strategies will enable the instructor to identify and meet individual student needs; it also provides a forum for suggesting course improvements. When planning and budgeting for the evaluation program, the program manager should aware of the expanded role it plays in the DL environment – it not only provides information to the course developers but can also provide a means for the student to remain "connected" to the learning situation.

The following information provides suggested techniques for facilitating student involvement in the learning process. These techniques do not apply to all situations. The appropriate feedback mechanisms for a given instructional program will be defined during the analysis and design phases.

- Use pre-class study questions and advance organizers to encourage critical thinking and informed participation on the part of all learners. Realize that it will take time to improve poor communication patterns.
- Early in the course, require students to contact the instructor and interact among themselves via electronic mail, so they become comfortable with the process. Maintaining and sharing electronic journal entries can be very effective toward this end.
- Arrange telephone office hours using a toll-free number. Set evening office hours if most of the students work during the day or are distributed widely over several time zones.
- Integrate a variety of delivery systems for interaction and feedback, including one-on-one and conference calls, fax, E-mail, video, and computer conferencing.
- Contact each site (or student) every week if possible, especially early in the course.
- Use pre-stamped and addressed postcards, out-of-class phone conferences, and e-mail for feedback regarding course content, relevancy, pace, delivery problems, and instructional concerns.
- Have students keep a journal of their thoughts and ideas regarding the course content, as well as their individual progress and other concerns. Have students submit journal entries frequently.
- Use an on-site facilitator to stimulate interaction when distant students are hesitant to ask questions or participate. In addition, the facilitator can act as your on-site "eyes and ears".
- Call on individual students to ensure that all participants have ample opportunity to interact. At the same time, politely but firmly discourage individual students or sites from monopolizing class time.
- Make detailed comments on written assignments, referring to additional sources for supplementary information. Return assignments without delay, using fax or electronic mail, if practical.

Management of DL Projects

Project Management Responsibilities – Planning

Based on a complete understanding of the IT project management process (discussed in the previous section) and an appreciation of the unique characteristics of the DL environment, the DL project manager is ready to begin the most critical phase of the project – planning.

DL project management responsibilities are the joint responsibility of the project manager and the course owner or customer. The project manager must perform all of the planning activities identified in the previous sections on project management as well as the following activities.

- Coordinate with related organizations to identify resources and constraints.
  - Consult with AFDLO representatives and upper headquarters management.
  - Consult AFDLO Homepage for latest guidance on DL standards and procedures.
  - Obtain organizational support for the DL project.
  - Coordinate with Air Force Career Field Managers (AFCFM) and other stakeholders.
  - Coordinate with accrediting agencies or certifying agencies to ensure that credit extends to DL applications.

- Get buy-in from leadership and stakeholders at all levels.
  - Course directors or training managers.
  - Air Force Career Field Managers (AFCFM).
  - IT team and all DL project and support staff.
  - DL instructors and facilitators.
  - Site Point of Contacts (POCs).

- Define the resources and constraints of the end users.
  - Conduct an in-depth resource analysis to identify infrastructure issues.
  - Identify DL facilities, delivery systems networks, and technical infrastructure requirements and constraints.

- Define special DL project team resource requirements.
  - Identify DL development platforms and facility requirements.
  - Identify need for facilitators, library resources (TOs and reference materials), administrative support etc.
  - Ensure design/development resources and equipment are in place.
  - Define staff training requirements.

Continued on the next page

Management of DL Projects (continued)

Project Management Responsibilities - Planning

Assess project feasibility.

- Conduct media feasibility and comparative cost analysis to identify potential media and Return on Investment (ROI) for course conversions.
- Perform a DL environmental and infrastructure/resource analysis.
- Establish project timelines and milestones.
- Determine if scope and schedule exceed in-house capability.
- Make a decision to contract or not to contract project development.
- Determine if there is adequate staffing support for the project.
- Determine if contract funds are available.

Develop project plan.

- Include contract oversight procedures, identify deliverables, and product quality standards.
- Obtain formal approval for your IT project plan via Memorandum of Understanding (MOU), Staff Summary Sheet (SSS), Memorandum of Agreement (MOA), etc.

Obtain project funding.

Project Management Responsibilities - Design

- Establish the DL development team.
- Obtain DL-trained project manpower or provide training for your DL team.
- Coordinate with site managers and base-level DL POCs.
- Establish life-cycle management procedures including the archiving of data.
- Schedule facilities, equipment, and networks well in advance.

Project Management Responsibilities - Production

Advertise and market the DL course (announcements, base newspapers, DL guide, Air Force Catalog of Formal Schools).

Project Management Responsibilities - Post-Production

Collect and report metrics data. (See information on metrics later in this section).

Matrix of the DL Project Management Process

The following table is a summary of sample tasks and activities associated with a DL project. The project plan must reflect the cost, schedule, and other resource requirements associated with each of those that apply.

Continued on the next page

Management of DL Projects (continued)

Requirement	Academic Development	Instructional Design	Production	Transmission	Reception
Planning	• Develop concept • Contracting • Funding • Faculty selection	• ISD technician selection • Contracting • Funding • Course selection	• Model development • Contracting • Funding • Staff acquisition • Production management planning • Video classroom renovation • New video classroom • Broadcast site survey • Equipment installation	• Model development • Contracting • Funding • Staff acquisition • Broadcast management planning • High speed data line • Equipment installation	• Model development • Contracting • Funding • Facilitator selection • Site surveys • Site management plan • Equipment installation
Operations	• Needs analysis • Learning objectives definition • Course selection • Faculty training • Student selection • Testing/ feedback • Administration and funding	• Course design • Instructional media selection • Graphic layout • Testing and evaluation	• Video taping • Audio taping • CBI development • Graphic arts • Live presentation • Printing	• Distance teaching • Satellite transmission • LAN transmission • Telephone/Fax • Mail	• DL • Facilitating • Equipment operations • Room and equipment scheduling • Telephone/ Fax • Mail
Manpower	• Faculty/SME • Faculty development staff • Video instructor • Library staff • Registrar • Plans staff • Administration staff • Maintenance staff	• Program manager • ISD technician • Graphic artists • CBI programmer • Contract manager	• Video/audio engineer • Communication/Computer staff • CBI programmer • Depository staff • Print staff • Graphics staff • Duplication staff	• Camera crews • Audio bridge manager • Satellite manager • Schedulers • Postal staff • Fax support • Communication/ Computer staff	• Education and training officer • Site technicians • Site facilitators • Maintenance staff • Admin. staff • Public affairs staff
Equipment	• Admin. supplies	• PC stations • PC hardware • Graphic support • Admin. supplies • Database server	• Video classrooms • Cameras • VCRs • Duplication decks • PC stations • Printers • Development servers	• Broadcast room • Satellite transformer • Audio bridge • Fax machines • Web servers	• Classroom • Satellite receiver • Large screen TVs • Audio transmitter • PC stations • Printers • Fax machines

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Management of DL Projects (continued)

Coordination Requirements for DL Projects

- Before initiating and fielding a DL project, be sure to coordinate with all appropriate organizations and agencies.
- Senior headquarters and MAJCOM must approve the project and provide funding, manpower, and other support if needed.
- The Air Force Distance Learning Office will ensure there is no negative impact on infrastructure. AFDLO should know project requirements as soon as possible to help size the infrastructure and fund infrastructure expansion if necessary.
- Notify field level personnel and DL site managers in plenty of time so they can schedule facilities and staff, and be prepared to facilitate the new course.
- Notify the National Guard and Reserve Command so that they can take advantage of expanded instructional opportunities for their members.
- Notify other services that may want to participate in a joint project.
- Notify the ATN Program Manager if the new course will be delivered using ATN.
- Coordinate with the Extension Course Institute if the new course will be distributed through that organization.
- Coordinate with Testing Centers as appropriate to help with proctored testing.

Metrics for Distance Learning

Purpose of Metrics

The purpose for establishing DL metrics is to ensure consistency in collection, analysis, and reporting of data used to measure DL effectiveness. Metrics are used to monitor trends and levels of effectiveness and efficiency over time.

Metric Indicators and Sample Data Elements

Instructional Effectiveness/Efficiency: This includes measures of the value of DL instruction to the organization.

- *Student performance.* (Examples include test scores, certifications, course completions, honor graduates, pass-fail rates, or dropout/attrition rates).
- *Quality/relevancy of instruction.* (Examples include customer review, student critiques, formative evaluations of DL products and process, operational surveys).
- *Time savings.* (Examples include IT compression rates compared to hours of resident instruction, fewer instructors, reduction in travel time).
- *Costs.*
  - Total cost per course/program.
  - Cost per student.
  - Cost per instructional hour.
  - Estimated and actual Return On Investment (ROI).

Technical/System Usage and Reliability: This includes measures of the usage and reliability of all technical systems and networks used for instructional delivery and the degree to which students and DL centers have technical difficulties.

- System utilization rates.
- Equipment failures.
- Percent down time.
- Point of failure/cause of failures.
- Student requests for technical assistance (student critiques, technical help desk).

Continued on the next page

Metrics for Distance Learning (continued)

Metric Indicators and Sample Data Elements (continued)

Administrative/Operational Effectiveness: This includes measures of the effectiveness of support functions and processes.

- Learner/Site notification procedures.
- Registration and learner administration.
- Materials handling (Examples include production and distribution of materials, complete shipping list, on-time delivery, sufficient quantity).
- Learner access to equipment.

Customer Satisfaction: This identifies the level of satisfaction of various customers and stakeholders. Data are usually collected from all primary customers and learners and samples of other user groups as required.

- Primary customers (Individual or organization having decision authority over a course of instruction - usually training managers/course directors who give feedback during formative evaluation process).
- Learners
- Instructors
- DL site POC/ESO/Job Site Training POC
- Course sponsors/functional managers
- MAJCOM/Learners' supervisors

Standard Distance Learning Course Conversion Process

Purpose

The purpose of the Standard Course Conversion Process is to ensure each schoolhouse follows standard procedures based on the principles of Instructional Systems Design (ISD) and best practices when converting resident courses to DL. A project manager who employs the Instructional Technology Development Process and the Project Management Process for DL defined in this chapter will be following the basic process. The following additional techniques and guidelines apply to the unique considerations associated with converting training materials to a DL presentation format.

Assumptions for Converting Resident Courses to DL

There are several important assumptions to bear in mind when considering conversion of a resident course to DL:

- It is assumed that a course and an approved curriculum already exist in resident format. ISD has been applied previously. Course documentation is available for review.
- Not all courses are good candidates for DL. A curriculum analysis and media feasibility analysis must be performed.
- The main reason to convert a course to DL is to make quality education and training opportunities available to learners in the most cost-effective manner.
- A comparative cost analysis using standard procedures and formulas will indicate the expected ROI for course conversions. This will indicate whether or not a conversion project is cost-effective in the long term.
- It is possible to use DL to shorten the length of a resident school by using DL for portions of the course. Instruction may be delivered in a DL format as a prerequisite or as follow-on to a resident course.
- DL project management is essentially the same as that used for IT development and should be coordinated and monitored by the appropriate instructional systems design professional acting as the project manager
- All of the warnings and techniques associated with DL project development must be considered during the conversion process. These were identified earlier in this section. The course must be converted to the *DL environment*, not just reformatted for application of other media.
- The curriculum will be redesigned and configured to take advantage of IT. Think about the course in different ways and organize objectives into modules if possible. As curriculum is redesigned for life-long learning and in support of ADL, this will be necessary.
- Use a mix or combination of media, if necessary, to deliver a course in DL.
- To form modules, prioritize and cluster and sequence objectives based on the types of learning, levels of learning--knowledge, skills, and attitudes-- and the required levels of interactivity.
- Validate instructional technology selection. Ensure selected media can support required levels of learning and levels of interactivity and that the technical and support infrastructure is robust enough for your project.